

interior of the United States and western Europe. This is, briefly, merely the contrast between a continental and a maritime climate. Except for the Pacific coast, and to a lesser extent the most outlying points on the North Atlantic coast, the climate of the United States is pre-vaillingly continental. Therefore in the United States,

generally speaking, inland locations should be better suited for aerodrome sites, as far as fog, haze, and low ceiling are concerned, than coastal locations. Especially will this be true for the Pacific coast as compared with regions east of the Rockies. This is in accord with Köppen's figures of fog frequencies in the United States.

### NOTES, ABSTRACTS, AND REVIEWS

*Meteorological summary for Chile, October, 1928 (by J. Bustos Navarret, Observatorio del Salto, Santiago, Chile).*—The characteristic features of the weather were weak intensity of atmospheric circulation and very light precipitation, even in the southern area.

Two important anticyclonic centers were charted—the first formed in the region of the Juan Fernandez Islands on the 5th, moved toward Chiloe on the 7th, and later remained stationary in the south for some time; the second forming in the same region as the first on the 20th, moved toward Chiloe and later, on the 25th, toward Argentina.

The depressions were of minor importance. Only three are worthy of mention, those of the 2d-3d and 12th-13th

off the middle coast and that of the 16th-18th in the far south. The first depression was accompanied by cloudiness, fog, and mist; the second by the same conditions and in addition scattered rains in the south. The third disturbance, which crossed the extreme southern region, caused rains from Chiloe to Arauco; it brought the most marked change in weather during the month and was followed by frost in the central region of Chile.

Rarely has there been observed such weak atmospheric circulation as that characterizing this month. The total monthly precipitation at Valdivia, one of the rainiest points in Chile, was only 1.29 inches (normal 5.28 inches) and at Santiago only 0.10 inch.—*Translated by W. W. R.*

### BIBLIOGRAPHY

C. FITZHUGH TALMAN, in Charge of Library

(NOTE.—Omitted this month but will be resumed in next issue.—*Ed.*)

### SOLAR OBSERVATIONS

By HERBERT H. KIMBALL, Solar Radiation Investigations

#### SOLAR AND SKY RADIATION MEASUREMENTS DURING NOVEMBER, 1928

For a description of instruments and exposures and an account of the method of obtaining and reducing the measurements, the reader is referred to the REVIEW for January, 1924, 52:42; January, 1925, 53:29, and July, 1925, 53:318.

Table 1 shows that solar radiation intensities averaged decidedly above normal values for November at Washington, D. C., and slightly above at Madison, Wis., and Lincoln, Nebr.

Table 2 shows that the total solar radiation received on a horizontal surface directly from the sun and diffusely from the sky was above the November normal at Washington, and decidedly below at Madison and Lincoln.

Skylight polarization measurements made at Washington on three days give a mean of 62 per cent, with a maximum of 67 per cent on the 5th. At Madison measurements made on two days give a mean of 75 per cent with a maximum of 76 per cent on the 6th. These are close to the corresponding average values for November at Washington and considerably above at Madison.

TABLE 1.—Solar radiation intensities during November, 1928

[Gram-calories per minute per square centimeter of normal surface]

Washington, D. C.

Date	Sun's zenith distance											Local mean solar time
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon	
	75th mer. time	Air mass										
		A. M.					P. M.					
		e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0	5.0	
Nov. 5	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
Nov. 6	5.56	0.72	0.85	0.99	1.30	1.59	1.30	1.06	0.93	0.82	4.17	
Nov. 7	4.95				1.18						5.79	
Nov. 8	9.14				1.27		1.09				3.63	
Nov. 9	3.45					1.59	1.29				8.48	
Nov. 14	4.75						1.28	1.10	0.92	0.83	3.30	
Nov. 20	4.57			1.08	1.31		1.17				4.95	
Nov. 22	3.81				1.32						3.45	
Nov. 23	3.45	.96	1.08	1.19				1.11			3.00	
Nov. 26	2.26		0.98	1.12							3.00	
Means		(0.84)	0.97	1.10	1.28	(1.59)	1.23	1.09	(0.92)	(0.82)	1.78	
Departures		+ .09	+ .11	+ .10	+ .10	+ .04	+ .06	+ .11	+ .09	+ .09		

<sup>1</sup>Extrapolated.

TABLE 1.—Solar radiation intensities during November, 1928—Con

[Gram-calories per minute per square centimeter of normal surface]

## Madison, Wis.

Date	Sun's zenith distance											
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon	
	75th mer. time	Air mass										Local mean solar time
		A. M.					P. M.					
		e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0	5.0	
Nov. 3	5.56			1.14							4.37	
Nov. 6	4.37	0.87	1.04	1.24	1.38	1.57		1.21			3.45	
Nov. 15	7.04		1.00	1.11							6.76	
Nov. 24	2.87	1.01	1.10	1.23							3.00	
Nov. 26	2.06	0.85	0.98	1.12				1.13			2.62	
Means		0.91	1.03	1.17	(1.38)	(1.57)		(1.17)				
Departures		+0.2	+0.1	+0.2	+0.8	+0.4		+0.1				

## Lincoln, Nebr.

Nov. 5	5.41	0.81	0.92	1.08	1.25	1.44		1.15	1.03	0.96	5.79
Nov. 6	4.57	0.83		1.03	1.31						5.36
Nov. 15	3.45							1.14	0.98		6.27
Nov. 20	2.74	0.91	1.08	1.25							3.30
Nov. 21	4.17		1.06								4.57
Nov. 22	3.00	1.13	1.22	1.33	1.46	1.61		1.30	1.21	1.10	2.87
Nov. 23	3.81			1.20	1.35	1.51					5.79
Nov. 24	3.00		1.18	1.30	1.44	1.60		1.20	1.07	(1.03)	2.36
Means		0.92	1.09	1.20	1.36	1.54					
Departures		-0.1	+0.5	+0.1	+0.1	-0.2		+0.1	+0.2	+0.9	

\* Extrapolated.

TABLE 2.—Solar and sky radiation received on a horizontal surface

[Gram-calories per square centimeter of horizontal surface]

Week beginning—	Average daily radiation						Average daily departure from normal		
	Washington	Madison	Lincoln	Chicago	New York	Twin Falls	Washington	Madison	Lincoln
1928	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
Oct. 29	266	169	146	122	127		+26	-15	-92
Nov. 5	258	122	242	106	144		+38	-43	+16
Nov. 12	211	114	156	91	109		+15	-24	-44
Nov. 17	182	137	246	91	96		0	+6	+44
Nov. 26	126	83	120	61	96		-27	-39	-64

Deficiency since first of year on Dec. 2.....-1,465 -466 -1,843

## POSITIONS AND AREAS OF SUN SPOTS

[Communicated by Capt. C. S. Freeman, Superintendent U. S. Naval Observatory. Data furnished by Naval Observatory, in cooperation with Harvard, Yerkes, and Mount Wilson Observatories. The differences of longitude are measured from central meridian, positive west. The north latitudes are plus. Areas are corrected for foreshortening and are expressed in millionths of sun's visible hemisphere. The total area, including spots and groups, is given for each day in the last column]

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longi-tude	Latitude	Spot	Group	
1928							
Nov. 1 (Naval Observatory).	11 16	-63.0	301.0	+14.5	108		
		-35.5	318.5	+13.5	15		
		-19.0	335.0	+14.0		15	
		+18.0	10.0	-15.5	31		
		+56.0	50.0	-10.0	123		
		+62.5	56.5	+17.5		77	369
Nov. 2 (Naval Observatory).	13 15	-39.0	300.7	+14.5	93		
		-21.5	318.2	+13.5	15		
		-3.5	336.2	+13.5		31	
		+30.5	10.2	-15.5	15		
		+72.0	51.7	-10.0	123		
		+80.0	59.7	+17.0	62		399
Nov. 3 (Yerkes)	10 58	-71.6	256.2	+21.2		75	
		-71.2	256.6	-16.2		400	
		-26.7	301.1	+15.4		100	575
Nov. 3 (Naval Observatory).	11 39	-72.5	254.9	+21.5	82		
		-72.5	254.9	-16.5	370		
		-46.5	280.9	+8.0	31		
		-27.0	300.4	+14.5	93		
		+80.0	53.4	-10.0	185		74

## POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longi-tude	Latitude	Spot	Group	
1928							
Nov. 4 (Yerkes)	10 38	-58.9	256.0	+21.0		75	
		-58.6	256.3	-15.5		375	
		-14.1	300.7	+15.0		175	625
Nov. 4 (Naval Observatory).	12 55	-75.0	238.5	-16.5		247	
		-58.5	255.0	+21.0	46		
		-58.5	255.0	-16.5	556		
		-31.5	282.0	+8.0	15		
		-13.0	300.5	+14.5	93		957
Nov. 5 (Yerkes)	11 34	-73.4	227.7	+13.0		250	
		-60.1	241.1	-16.1		250	
		-45.4	255.6	+21.0	100		
		-45.0	256.1	-16.0	350		
		-0.1	301.0	+15.1		125	1,076
Nov. 5 (Naval Observatory).	11 48	-74.0	227.0	+12.5	154		
		-60.5	240.5	-18.5		185	
		-46.0	255.0	+21.0	31		
		-46.0	255.0	-16.0	432		
		+0.5	301.5	+15.0		93	895
Nov. 6 (Naval Observatory).	11 38	-61.5	226.4	+12.5	201		
		-48.0	239.9	-16.5		154	
		-32.5	255.4	+21.0	31		
		-32.0	255.9	-16.5	463		
		+12.5	300.4	+15.0	93		942
Nov. 7 (Naval Observatory).	11 19	-48.5	226.4	+12.5	185		
		-34.5	240.4	-17.0		139	
		-20.0	254.9	+21.0	31		
		-19.5	255.4	-16.5	478		
		+26.0	300.9	+15.5	93		926
Nov. 8 (Naval Observatory).	11 28	-35.0	226.6	+12.5	170		
		-19.5	242.1	-17.0		154	
		-7.0	254.6	+21.0	31		
		-5.5	256.1	-16.5	478		
		+40.0	301.6	+16.5	93		926
Nov. 9 (Naval Observatory).	11 36	-22.0	226.3	+12.5	123		
		-7.5	240.8	-17.0		108	
		-7.0	241.3	+9.0		139	
		+6.0	254.3	+20.0	31		
		+8.0	256.3	-17.0	401		
		+34.0	282.3	+6.5		46	
		+53.0	301.3	+15.5	93		941
Nov. 10 (Naval Observatory).	13 40	-8.0	226.0	+12.5		154	
		+8.0	242.0	-17.0		93	
		+9.5	243.5	+9.0		293	
		+20.0	254.0	+20.5	15		
		+22.5	256.5	-16.5	432		
		+68.0	302.0	+16.0	77		1,064
Nov. 11 (Naval Observatory).	11 24	-85.0	137.1	+14.0		216	
		+4.0	226.1	+12.5		139	
		+20.5	242.6	-16.5		82	
		+21.5	243.6	+9.5		386	
		+32.0	254.1	+21.0	15		
		+35.0	257.1	-16.5	525		
		+80.0	302.1	+15.5	77		1,420
Nov. 12 (Naval Observatory).	11 24	-70.0	138.9	+14.0		154	
		+18.0	226.9	+12.5		108	
		+33.0	241.9	-16.5		93	
		+35.5	244.4	+9.5		417	
		+45.0	253.9	+21.0	15		
		+48.5	257.4	-16.5	463		1,250
Nov. 13 (Naval Observatory).	11 40	-70.5	125.1	-14.5		46	
		-58.0	137.6	+15.0		170	
		-29.5	166.1	-14.5		62	
		+30.5	226.1	+12.5		108	
		+50.0	245.6	+10.0		262	
		+58.5	254.1	+21.5	15		
		+62.0	257.6	-16.0	355		1,018
Nov. 13 (Yerkes)	12 3	-57.0	139.4	+15.7		190	
		+31.1	226.5	+13.2		200	
		+45.4	240.8	+9.6		100	
		+53.0	248.4	+9.7		100	
		+63.0	258.4	-15.7		625	1,215
Nov. 14 (Naval Observatory).	11 36	-59.0	123.4	-14.5		62	
		-44.5	137.9	+15.5		123	
		-36.5	145.9	-22.0	15		
		-15.0	167.4	-14.5		77	
		+43.5	225.9	+13.5		77	
		+60.0	242.4	-16.5	15		
		+62.5	244.9	+9.5		216	
		+76.5	258.9	-16.0	247		882
Nov. 14 (Yerkes)	12 53	-44.3	137.4	+16.6		150	
		-12.9	168.8	-14.6		75	
		+44.9	226.7	+13.5		125	
		+66.8	248.5	+9.4		150	
		+78.7	260.2	-15.4		500	1,000
Nov. 15 (Naval Observatory).	11 38	-45.5	123.7	-14.0	46		
		-31.5	137.7	+15.0		139	
		0.0	169.2	-16.5		139	
		+6.5	175.7	+11.5	31		
		+57.5	226.7	+12.5	31		
		+79.5	248.7	+10.0	247		633